



UC/FPCE\_2014

Universidade de Coimbra  
Faculdade de Psicologia e de Ciências da Educação

**Inflexible diet in normal weight college students:  
What is behind it?**

Ana Filipa Pitorro Martinho (e-mail: [anamartinho91@gmail.com](mailto:anamartinho91@gmail.com))

Dissertação de Mestrado em Psicologia em Psicologia Clínica e de  
Saúde (Especialização em Intervenções Cognitivo-  
Comportamentais nas Perturbações Psicológicas e de Saúde) sob  
orientação da Professora Doutora Cláudia Ferreira

## **Acknowledgements**

Firstly, I would like to thank my thesis supervisor, Professor Cláudia Ferreira, for all her support and for being so patient with me during the preparation of this work. But, above all, for being the kind person she was in the most difficult moments.

I would also like to thank Professor Pinto-Gouveia and all the members of his team of professors and professionals, for sharing their knowledge and for being available to help all along these last two years.

Thanks to all the Professors of the Faculdade de Psicologia e Ciências da Educação of the University of Coimbra whom I had the privilege of learning from and who helped me to grow in the science that Psychology is.

Thanks to all my student colleagues, who shared my pains in the difficult moments, but also, and above all, brought me their joy and companionship in more “relaxed” moments.

To Inês for her availability and fundamental help over this crucial year.

To Ângela and Sandra, who showed that distance can be breached by a simple phone call. And above all for their friendship and unconditional support during these last five years.

To Andreia, for having shared a wonderful year of learning and growth, as Psychologists. And for the wonderful friendship that developed therefrom.

To my fellow students Mariana, Patrícia, Vanessa and Marta, for the adventure and companionship that we shared in the preparation of this work.

To my brother, João, and my Father, Carlos, for the unconditional support they gave me during these years, for their patience in the moments of despair and for their help in making this dream come true.

To my Aunt and Uncle, Isabel and Rui, who gave me the privilege of having two extra parents. For their care and protection, above all in the past year.

To all my family, who witnessed the start and the finish of this period of my life, for the moments of comfort and support.

To my friends, for their friendship and for the moments of relaxation and joy that they created during these years.

To Pedro, who was always at my side, for all the support, kindness and friendship along this road.

And lastly, a special thanks to you, Mother, for never having given up of me. Thank you, for the supporting words, even when you couldn't speak, but also for standing silently beside me when a simple gesture was worth more than a thousand words. And thank you for showing me that there are no impossibles.

## **Table of Contents**

Paper I: Inflexible diet in normal weight college students: What is behind it?.....	4
---	---

## PAPER I

Martinho, A., & Ferreira, C. (2014). *Inflexible diet in normal weight college students: What is behind it?*

## **Inflexible diet in normal weight college students: What is behind it?**

### **Authors**

Ana Filipa Pitorro Martinho, BS <sup>1</sup> \*

Cláudia Ferreira, M.S., Ph.D <sup>1</sup>

<sup>1</sup> University of Coimbra, Portugal

CINEICC – Cognitive - Behavioral Research Center

\* Correspondence concerning this article should be addressed to:

Ana Martinho

CINEICC, Faculdade de Psicologia e Ciências da Educação,

Universidade de Coimbra

Rua do Colégio Novo, Apartado 6153

3001-802 Coimbra, Portugal

E-mail: anamartinho91@gmail.com (Ana Martinho)

Telephone: (+351) 239851450

Fax: (+351) 239851462

## **Inflexible diet in normal weight college students: What is behind it?**

### **Abstract**

Restrictive diet is an increasing characteristic behavior of women in Western societies. Currently, there are several known factors that motivate diet, such as a sense of dissatisfaction with one's body. However, what distinguishes diets adopted by most women from pathological diets is the latter's rigid and inflexible character. In this regard, a scale that aims to evaluate rigid and inflexible eating patterns, namely the Inflexible eating Questionnaire (IEQ), was recently developed. However, the study of the processes that explain the adoption of an inflexible and rigid dietary pattern remains incomplete. In this context, this study aims at analyzing the possible variables that explain why women who have a normal body mass index (BMI) opt for highly rigid and inflexible diets.

The study comprised 508 university students who presented a BMI between 18.5 and 25. Participants indicated their current and ideal weight. In addition, they filled scales related with inflexible eating, inflexibility body image, and social comparisons based on physical appearance.

The results show that both measures of psychological inflexibility are associated with each other, and that body image inflexibility is associated with unfavorable social comparisons and body dissatisfaction. In addition, inflexibility regarding body image partially mediates the relationship between body dissatisfaction and inflexible eating, and totally mediates the relationship between unfavorable comparisons based on physical appearance and inflexible eating.

This study pioneers the use of a measure of inflexible eating, validating the importance of interventions that promote psychological flexibility.

**Key-words:** Dietary restraint; Body dissatisfaction; social comparison based on physical appearance; Acceptance and Commitment Therapy; psychological inflexibility.

## **Resumo**

A dieta restritiva é um comportamento cada vez mais característico das mulheres, nas sociedades ocidentais. Atualmente, são conhecidos vários fatores que motivam a dieta, como por exemplo a insatisfação corporal. Contudo, o que acaba por distinguir dietas levadas a cabo pela maioria das mulheres de uma dieta patológica é o seu caráter rígido e inflexível. Neste sentido, foi recentemente desenvolvida uma escala que tem como objetivo avaliar padrões de alimentação rígidos e inflexíveis, nomeadamente o Questionário de Inflexibilidade Alimentar (IEQ). Contudo, o estudo sobre os processos que explicam a adoção de um padrão alimentar rígido e inflexível permanece incompleto. Neste contexto, este estudo teve como objetivo analisar as possíveis variáveis que explicam o endosso em dietas altamente rígidas e inflexíveis em mulheres que apresentam um índice de massa corporal (IMC) normativo.

O estudo foi constituído por 508 estudantes universitárias que apresentaram um IMC entre os 18,5 e 25. As participantes indicaram o seu peso atual e ideal. Para além disso, preencheram escalas relacionadas com a inflexibilidade alimentar, inflexibilidade relacionada com a imagem corporal e comparações sociais com base na aparência física.

Os resultados mostram que as duas medidas de inflexibilidade psicológica se associam entre si, bem como a inflexibilidade relativa à imagem corporal se associa a comparações sociais desfavoráveis e à insatisfação corporal. Ainda, a inflexibilidade relativa à imagem corporal media parcialmente a relação entre a insatisfação corporal e



inflexibilidade alimentar e medeia totalmente a relação entre as comparações desfavoráveis com base na aparência física e a inflexibilidade alimentar.

Este estudo apresenta-se como pioneiro na utilização de uma medida de inflexibilidade alimentar, validando a importância de intervenções que promovam a flexibilidade psicológica.

**Palavras-chave:** Dieta alimentar; insatisfação corporal; comparação social com base na aparência física; Terapia da Aceitação e compromisso; Inflexibilidade Psicológica

## 1. Introduction

Dieting can be defined as an intentional and continuous restriction of calorie intake in order to achieve body weight maintenance or loss (Herman & Mack, 1975). This behavior is so prevalent today within the female population (adolescent and adult), that it is often regarded as a "normative eating" in Western societies (Polivy & Herman, 1987). Indeed, due to the easy access to abundant food that is characteristic of modern societies, restrictive diet seems to emerge as a solution for weight control (Rodin, Silberstein, & Striegel-Moore, 1985). However, this behavior seems to have a paradoxical effect and has come to be considered as a risk factor of weight gain and obesity in women (Field et al., 2003; French et al., 1994; Klesges, Isbell, & Klesges, 1992; Stice, Cameron, Killen, Hayward, & Taylor, 1999; Stice, Presnell, Shaw, & Rohde, 2005). In addition, dieting has been associated to other maladaptive eating patterns such as binge eating (Stice, Presnell, & Spangler, 2002), bulimic pathology (Stice, 2001), and general eating disorders (Killen, et al., 1994; Killen, et al, 1996),

One of the main causes for the adoption of restrictive diets is body dissatisfaction (Higgins, 1987), which is conceptualized as a negative subjective experience of one's weight and body shape (Stice & Shaw, 2002). This negative evaluation of body image and weight is quite common among women in Western societies (Ferreira, 2012; Grabe, Ward, & Hyde, 2008), even among women with a normal body mass index.

In fact, in Western societies the notion that an increasingly thin body is the ideal pattern of beauty and female attractiveness has been noted to become widely diffused (Garner, Garfinkel, Schwartz, & Thompson, 1980). Besides that, various studies have documented that the beauty ideal that is most highly valued today is rarely achieved, which explains the increased perception of discrepancy between most women's current

body image and the "ideal" body image (Ferreira, 2003). This overvaluation of thinness, mainly disseminated by the media, seems to contribute to increased body dissatisfaction in Western women (e.g., Spettigue & Henderson, 2004).

In addition, literature has been emphasizing physical appearance as a key area in self-evaluation processes, and as one of the main dimensions of social comparison used by women (Gilbert, Price & Allan, 1995; Troop, Allan, Treasure, & Katzman, 2003). Indeed, women are constantly bombarded with messages that value thinness and display eating control as equating power, success and happiness (e.g., Buote et al., 2011; Garner et al., 1980). Thus, a negative perception of physical appearance is often associated with a perception of inferiority and inadequacy (Ferreira, Pinto-Gouveia, & Duarte, 2013).

Different studies have shown that social comparisons based on physical appearance are often self-deprecating (e.g., O'Brien et al, 2009; Strahan, Wilson, Cressman, & Buote, 2006). This negative self-evaluation of body image can be explained, on one hand, due to the fact that most women make comparisons with the "perfect" bodies as shown by the media (e.g., models) which are believed to represent the pattern by which they will be evaluated by others (Engeln-Maddox, 2005; Heinberg & Thompson, 1995; Kruglanski & Mayseless, 1990; Strahan et al., 2006). On the other hand, in their own social context, women tend to feel pressured by their peer group to be thinner (Irving, 1990).

In this way, many women may believe that by losing weight they'll seem more attractive to others (e.g. Jarry, Polivy, Herman, Pliner, & Arrwood, in press; Jones, 2001). So, restrictive dieting may emerge as a strategy leading to an "ideal" of beauty and promoting approval or appreciation by the social group (Ferreira et al., 2013).

In accordance to the Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012), negative internal experiences, i.e., perceptions, sensations or

undesired cognitions (e.g., related to body image) are universal and inevitable in human beings. Further, and in accordance with this approach, the experienced suffering isn't originated from the occurrence or content of undesired experiences, but rather results from how we relate to these internal events (Hayes, Strosahl, & Wilson, 1999). The attempt to prevent or control these internal experiences paradoxically tends to increase their frequency and intensity instead of eliminating them (Hayes et al., 1999). The inability to accept and to be flexible in the presence of undesired thoughts, emotions and sensations was designated by ACT as psychological inflexibility (Merwin, et al, 2011), which has appeared associated with various forms of psychopathology (Kashdan & Rottenberg, 2010), and as a central process of eating disorders (Masuda et al., 2012; Rawal, Park, & Williams, 2010).

Specifically, inflexibility in relation to body image can be understood as the unwillingness to experience, fully and intentionally, perceptions, sensations, emotions and thoughts associated with body image, even when they are unwanted (Sandoz, Wilson, Merwin, & Kellum, 2013). This specific construct involves inflexible adherence to cognition (as reflected, for example, in the need to control these experiences) and rigid behavioral patterns that prevent the individual from conducting a valued life style (Sandoz, Wilson, & DuFrene, 2010). Recently, inflexibility regarding body image has been associated with body dissatisfaction (e.g., Sandoz, et al., 2013) as well as with unfavorable comparisons based on physical appearance (e.g., Ferreira, Pinto-Gouveia, & Duarte, 2011). In addition, a recent study of Wendell and colleagues (2012), showed that body image inflexibility acts as a mediator in the association between cognitions related to physical appearance (e.g. dissatisfaction with body image) and dieting.

Despite the efforts made to adapt psychological inflexibility measures to several specific areas (e.g., BI-AAQ), there still are gaps in the assessment of other forms of psychological inflexibility. In this context, a scale that measures inflexibility in relation to dietary patterns, the Inflexible Eating Questionnaire (Ferreira Pinto-Gouveia, Duarte, & Martinho, 2014), was recently developed. This scale aims to assess the adoption of a set of rigid and verbal rules regarding eating (Ferreira et al, 2014).

A recent study showed that inflexible adherence to dietary rules, i. e, the adoption of rules without regard to external (e.g, social context) or internal (e.g., hunger) contingencies is a key factor in understanding eating psychopathology (Ferreira, Trindade, & Duarte, 2014). However, the processes that explain rigid or inflexible adoption of a restrictive eating pattern have yet to be explored.

Considering the relevance of negative body image-related experiences, regardless of body weight, and given the impact these experiences have on eating behaviors, and also on the quality of life and well-being of women (Mond et al., 2013), the aim of this study is to explore variables that explain the adoption of an inflexible dietary pattern in women with a normative BMI (WHO, 2000). According to the ACT approach, we hypothesized that psychological inflexibility regarding body image mediates the relationship between unwanted experiences related to body image (i.e, body dissatisfaction and perceptions of inferiority based on physical appearance) and involvement in a dietary pattern guided by inflexible rules.

## 2. Materials and Methods

### 2.1. Participants

The sample used in this study was composed of female college students of different Portuguese Universities, aged between 18 and 25 years old ( $M = 20.29$ ;  $SD = 1.75$ ) and a mean of 13.19 ( $SD = 1.38$ ) years of education.

In accordance with the aim of this study, 508 participants were selected, who had showed a normal, i.e. between 18.5 and 24.98 ( $M = 21.37$ ;  $DP = 1.62$ ), body mass index.

### 2.2. Measures

*Demographic Data.* Before the completion of the scales the participants were asked about their age, educational level, current weight, ideal weight and current height.

*Body Image – Acceptance and Action Questionnaire (BI-AAQ; Sandoz et al., 2013; Portuguese version by Ferreira et al, 2011).* This scale is composed by 12 items which measure psychological inflexibility regarding body image. Items are rated in a 7-point Likert scale from 1 (“Never true”) to 7 (“Always true”). High scores reflect high psychological inflexibility regarding body image. This scale has shown good internal consistency both in the original study ( $\alpha = .93$ ), and in the Portuguese validation study ( $\alpha = .95$ ).

*Inflexible Eating Questionnaire (IEQ; Ferreira et al., 2014).* The IEQ is a 15-item self-report scale which was developed to access inflexible eating patterns. Items are rated in a 5-point Likert scale (1 corresponds to “totally disagree”, and 5 corresponds to “totally agree”). Higher scores reveal greater inflexibility in the adoption of verbal rules related to eating. This scale was shown to hold strong psychometric qualities, having had a Cronbach's alpha value of .95 in the original study.

*Figure Rating Scale (FRS; Thompson & Altabe, 1991; Ferreira, 2003).* The FRS is an instrument that measures the degree of discrepancy between the current and the ideal body image of the participant, thus assessing the degree of body dissatisfaction. This scale includes 9 nine silhouettes of different dimensions, that are presented in an ascending order according to its number. In other words, number 1 corresponds to a thinner body shape and number 9 corresponds to a larger body shape.

*Social Comparison through Physical Appearance Scale (SCPAS – Ferreira, et al, 2013).* The SCPAS assesses the subjective perception of women in relation to attractiveness, social rank and adjustment to the group, according to how they compare themselves with others, with reference to body image. This scale consists in two parts; each part is composed of 12 items on a 10-point Likert scale, representing opposing constructs (e.g., Lower / higher; ugly / beautiful). The participant selects the number which best translates the way they feel in relation to other people (friends, colleagues or known girls - Part A) and, then, in relation to models, actresses or other celebrities (Part B). Lower scores represent more unfavorable comparisons. This scale showed good internal consistency in the original study on both the first ( $\alpha = .94$ ) and the second ( $\alpha = .96$ ) parts of the scale.

Considering the aim of this study, we only used the first part of the scale (comparisons with peers).

### **2.3. Procedures**

The present study is part of a more comprehensive project about the eating behavior of individuals of the Portuguese population aged between 15 and 25 years. This research protocol was reviewed and approved by the Ethics Committee of the educational institutions enrolled in the study. Participants were recruited from several

areas of learning of those Portuguese educational institutions. First, the participants were informed about the objectives of the research and the voluntary nature of their participation, and the confidentiality and anonymity of data. Then, participants who agreed to participate in the research gave their written informed consent before completing the protocol.

The completion of the questionnaires took place in a classroom context with the presence of two researchers, having had a duration of approximately 35 minutes.

In its totality, 810 questionnaires were filled (by male and female participants). In accordance with the objectives of this study, the data were cleaned in order to exclude the male subjects, leaving 688 participants. Later, subjects that were not included within the considered age interval (18-25 years) or that presented a body mass index lower than 18.5 or above 25 were also excluded, which resulted in a reduction of the sample to 514 subjects. Lastly, all participants that had failed to fill all the questionnaire's items were also excluded, which resulted in the final sample of 508 participants.

### **2.3.1. Statistical analyzes**

The software that was used to perform the data analyses was IBM SPSS Statistics 20 (IBM Corp, 2011).

Descriptive statistics were performed (mean and standard deviation) in order to analyze the characteristics of the study's variables ( $N = 508$ ).

We explored the degree of weight dissatisfaction, i.e., number and percentage of subjects who want to lose weight (current weight – ideal weight  $> 0$ ) or to gain weight (current weight – ideal weight  $< 0$ ). We, also, explored the degree of weight



satisfaction, i.e., the number and percentage of subjects who want to maintain their current weight (actual weight – ideal weight = 0).

In addition, we explored the degree of dissatisfaction with body shape, i.e., the number and percentage of participants who want to have a thinner (FRS > 0) or larger (FRS < 0) body shape. We also explored the number of subjects who are satisfied with their body shape, i.e., those participants who want to maintain their current body shape (FRS = 0).

Later, Pearson correlation analyses were performed to explore the relationship between body dissatisfaction, social comparison through physical appearance (with peers), psychological inflexibility regarding body image, and inflexible eating (Cohen, Cohen, West, & Aiken, 2003).

Then, we performed two mediation analyses using linear regression models in accordance to the four-step analysis suggested by Baron and Kenny (1986). In both mediations, we used psychological inflexibility regarding body image as mediator on the association between the independent variables (body dissatisfaction – model 1; social comparison through physical appearance with peers – model 2) and the dependent variable (inflexible eating).

In this way, the proposed variable (psychological inflexibility regarding body image) functions as a mediator when it fulfills the following conditions: the predictor variable significantly regresses on the dependent variable; ii) the predictor variable significantly regresses on the mediator; iii) the mediator and the predictor variables significantly regress on the outcome of the dependent variable. To conclude, it is necessary to observe a significant reduction of the impact of the independent variable on the dependent variable, when the mediator variable is introduced (Baron & Kenny,

1986). Finally, a *Sobel* test was conducted to confirm the significance of the indirect effect of the predictor variable on the outcome, through its effect on the mediator.

### 3. Results

#### 3.1. Preliminary analyses

We performed a Kolmogorov-Smirnov test and analyzed the skewness and kurtosis values in order to evaluate the assumption of the normal distribution of the data. The results allow us to conclude, according to Kline (1998), that the data of the study variables follow a normal distribution. This assumption was further corroborated by visual inspection of the graphs of the data distribution. Additionally, we examined the adequacy of the data for regression analyzes.

*Residuals scatter plots* analyses showed that the residuals were normally distributed, had linearity and no heteroscedasticity. The independence of errors through graphic analyses and *Durbin-Watson* values were also examined (Field, 2004). Furthermore, the presence of multicollinearity or singularity between variables was also demonstrated, since the *Variance Inflation Factor (VIF)* values indicated the absence of problems in the  $\beta$  estimation. In brief, these procedures confirm the adequacy of the data under study to perform regression analyzes.

#### 3.2. Descriptive analyses

Means and standard deviations for the total sample ( $N = 508$ ) are presented in Table 1.

In relation to weight, it was found that 433 (85.24%) of the participants were unsatisfied with their current weight, of which 377 (74.21%) reported a desire to lose

weight, and 56 (11.2%) to gain weight. Also, it was possible to observe that 75 (14.77%) of the subjects reported their current weight as their ideal or desired weight.

In addition, it was found that 353 (69.49%) participants were unsatisfied with their current body shape, of which 308 (60.63%) reported a desire to have a thinner body shape, and 45 (8.86%) wished to have a larger body shape. Finally, it was possible to observe that 155 (30.51%) subjects wanted to maintain their current body shape.

### **3.3. Correlations**

Pearson's correlation coefficients (two-tailed) are presented in Table 1.

The analysis showed that body dissatisfaction appears to be associated with unfavorable social comparisons based on physical appearance with peers, with greater psychological inflexibility regarding body image, and with greater inflexible eating.

In addition, it was possible to observe that inflexible eating and body dissatisfaction are also associated with unfavorable social comparisons based on physical appearance.

Finally, we found that both two measures of inflexibility (BI-AAQ and IEQ) are positively associated with each other, with a high correlation.

**Table 1**

*Cronbach's alphas, Means (M), Standard Deviations (SD), and Intercorrelation scores on self-report measures (N = 508)*

Measures	1	2	3	4
1.FRS	-			
2. SCPAS_peers	-.23***	-		
3.BI-AAQ	.41***	-.27***	-	
4. IEQ	.40***	-.17***	.64***	-
$\alpha$	-	.91	.94	.95
<i>M</i>	.66	63.44	28.08	27.29
<i>SD</i>	.87	12.53	13.77	9.73

*Note.* FRS = The Figure Rating Scale; SCPAS\_peers = Social Comparison through Physical Appearance Scale: part A; BI-AAQ = Body Image – Acceptance and Action Questionnaire; IEQ = Inflexible eating Questionnaire

\*  $p < .050$ . \*\*  $p < .010$ . \*\*\*  $p < .001$ .

### 3.4. Mediation analyses

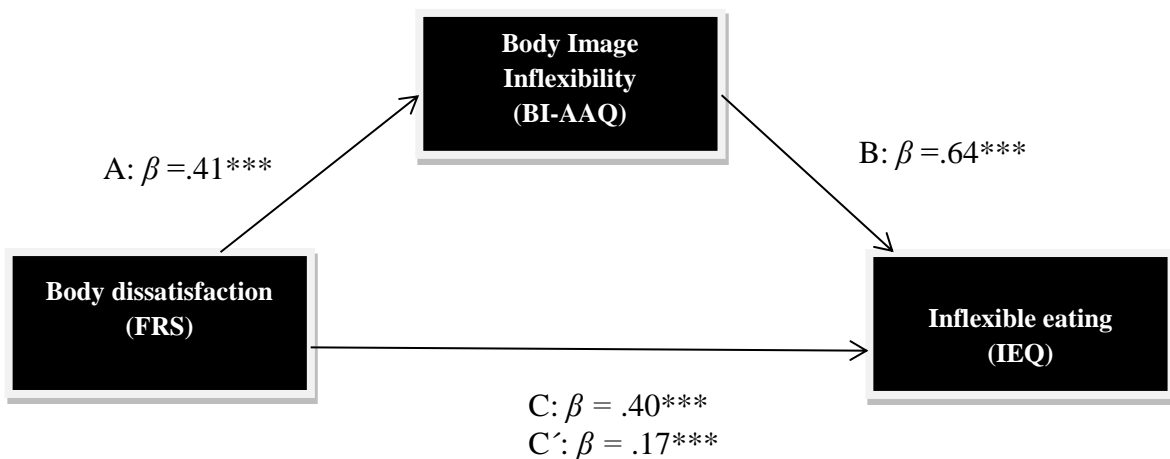
To further understand the role of psychological inflexibility regarding body image as a possible mediator on the association between: 1) body dissatisfaction (FRS) and 2) social comparison through physical appearance with peers (SCPAS), and inflexible eating (IEQ), two mediation analyses were performed.

#### 3.4.1 Psychological inflexibility regarding body image as a mediator between body dissatisfaction and inflexible eating.

First, a regression analysis was performed between FRS (independent variable) and IEQ (dependent variable). The model showed significance ( $F_{(1,506)} = 96.40$ ;  $p < .001$ ), explaining 16% of inflexible eating ( $\beta = .40$ ;  $p < .001$ ).

Then, we performed a regression analysis between FRS (independent variable) and BI-AAQ (dependent variable). In this analysis, the model also showed significance ( $F_{(1,506)} = 100.06$ ;  $p < .001$ ;  $\beta = .41$ ;  $p < .001$ ).

Finally, a regression analysis was conducted with BI-AAQ and FRS (as independent variables) and IEQ (as dependent variable). This last model also showed significance ( $F_{(2,505)} = 188.49$ ;  $p < .001$ ), explaining 42.7% of the variance of inflexible eating. Results also showed that when the mediator variable is introduced in the model, body dissatisfaction's  $\beta$  is reduced to .17 ( $p < .001$ ), while the mediator variable emerges as the best predictor ( $\beta = .57$ ;  $p < .001$ ). The Sobel test also confirmed the significance of the mediator effect ( $Z = 8.39$ ;  $p < .001$ ), demonstrating that psychological inflexibility regarding body image partially mediates the effect of body dissatisfaction on inflexible eating (figure 1).



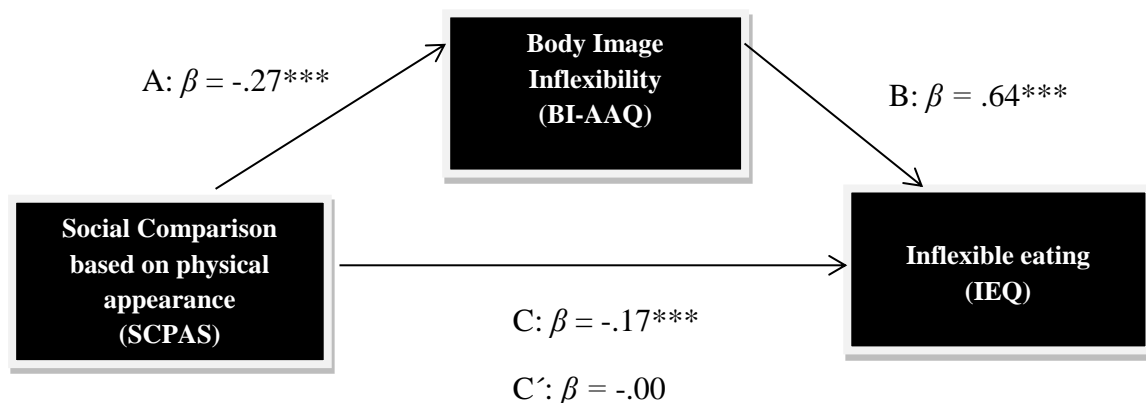
**Figure 1.** The relationship between the Figure Rating Scale (FRS) and the Inflexible Eating Questionnaire (IEQ) mediated by the Body Image – Acceptance and Action Questionnaire (BI-AAQ). A= the relation between the independent variable and mediator, B = the relation between mediator and dependent variable, C = the direct effect of the independent variable on the dependent variable, C' = the indirect effect of the independent variable on the dependent variable controlling for the mediator

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

### 3.4.2 Psychological inflexibility regarding body image as a mediator between social comparisons based on physical appearance with peers and inflexible eating

First, a regression analysis was performed with SCPAS (independent variable) and IEQ (dependent variable). This model showed significance ( $F_{(1,506)} = 15.407$ ;  $p < .001$ ), explaining 3% of the variance of inflexible eating ( $\beta = -.17$ ;  $p < .001$ ). Then, having SCPAS as the independent variable and BI-AAQ as the dependent variable, results demonstrated a significant model ( $F_{(1,506)} = 39.586$ ;  $p < .001$ ), which presented a  $\beta$  of  $-.27$  ( $p < .001$ ).

The last regression was established between SCPAS and BI-AAQ as independent variables and IEQ as the dependent variable. This last model showed significance ( $F_{(2,505)} = 170.645$ ;  $p < .001$ ), explaining 40.3% of the variance of inflexible eating. These results also revealed that when BI-AAQ is added, the predictor variable's  $\beta$  no longer becomes significant ( $\beta = -.00$ ;  $p = .979$ ), while the mediator variable emerges as the best predictor ( $\beta = .64$ ;  $p < .001$ ). The *Sobel* test was significant as well ( $Z = -5.94$ ;  $p < .001$ ), confirming that psychological inflexibility regarding body image totally mediates the effect of social comparison based on physical appearance with peers on inflexible eating (figure 2).



**Figure 2.** The relationship between Social Comparison through the Physical Appearance Scale (SCPAS) and the Inflexible Eating Questionnaire (IEQ) mediated by the Body Image – Acceptance and Action Questionnaire (BI-AAQ). A = the relation between the independent variable and mediator, B = the relation between mediator and dependent variable, C = the direct effect of the independent variable on the dependent variable, C' = the indirect effect of the independent variable on the dependent variable controlling for the mediator

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## 5. Discussion

Psychological inflexibility regarding body image is conceptualized by the unwillingness to experience, fully and intentionally, perceptions, sensations, emotions and thoughts associated with body image, even when they are unwanted (Sandoz, et al, 2013). Experiential avoidance and the rigid adherence to such unwanted cognitions is associated to an increased tendency to act uncommittedly to one's personal life values (Sandoz, et al, 2010). This emotional regulation process seems to emerge as a mediator in the association between cognitions related to physical appearance (e.g., dissatisfaction with body image) and behaviors in the pursuit of thinness (Wendell et. al, 2012; Ferreira, et al, 2011; Sandoz et al., 2013).

Recently, a scale that measures inflexibility in relation to dietary patterns, the Inflexible Eating Questionnaire (IEQ; Ferreira, et al., 2014), was developed. This scale fills a gap in the existent research, as it allows access to another form of psychological inflexibility, namely the inflexibility regarding dieting patterns. In this context, this study is pertinent as it aims to explore processes that explain the adoption of rigid and inflexible dieting behaviors in young women (18 to 25 years old) who present a normal body mass index.

The results obtained in this study enabled us to observe that even with a normal BMI, the majority of women (85.24%) appeared dissatisfied with their current weight, and that 74.21% of them wanted to lose weight. It was also found that most women in the sample (69.49%) were dissatisfied with their current body image, and that 60.63% of the participants wanted to have a thinner body shape. These results are consistent with what has been recognized in previous studies (Ferreira, 2012; Grabe, Ward, & Hyde, 2008), since they seem to corroborate the notion that weight and body dissatisfaction are normative phenomena in women in Western cultures. However, our results seem to add to the existing literature, since they demonstrate the presence of similar levels of dissatisfaction with weight and body image among women with a normal BMI.

It was also possible to confirm that body dissatisfaction is associated with greater inflexibility regarding body image. This result is consistent with the data observed in other studies, suggesting that negative evaluations of body image tend to be associated with rigid adherence to these same internal experiences (Sandoz et al., 2013). In other words, the unwillingness to experience unwanted perceptions, sensations, emotions and thoughts related to body image is associated with a greater degree of body dissatisfaction.

In addition, we found that unfavorable social comparisons based on physical appearance with peers is associated with a greater inflexibility regarding body image, which corroborates the results of previous studies (e.g., Ferreira et al, 2011). In this context, women who tend to compare themselves negatively to others (based on their physical appearance) show greater unwillingness to accept thoughts, emotions and sensations related to body image.



This study also reveals a strong association between the two measures of inflexibility of this study (BI-AAQ and IEQ). This result seems to suggest that women who adhere rigidly and inflexibly to cognitions and feelings related to body image tend, in turn, to adopt more rigid and inflexible diet behaviors. Furthermore, this study shows the existence of an association between the study variables (social comparison and body dissatisfaction based on physical appearance) and eating inflexibility, suggesting that increased experience of unwanted internal experiences (e.g., weight and body shape dissatisfaction, and unfavorable social comparison based on physical appearance with peers) is associated with the endorsement of inflexible behaviors related to eating.

Finally, two mediation analyses were performed in order to explore the role of inflexibility regarding body image as a possible mediator on the association between: 1) body dissatisfaction (FRS) and 2) social comparison through physical appearance with peers (SCPAS), and inflexible eating (IEQ).

Results appear to reflect that the relationship between these negative internal experiences (body dissatisfaction and unfavorable comparisons based on physical appearance) and the adoption of an inflexible dietary pattern depends on the ability to accept and the willingness to experience thoughts, feelings and sensations related to body image, even when unwanted. That is, although body dissatisfaction and social comparisons based on physical appearance explain the adoption of inflexible and rigid eating behaviors, psychological inflexibility regarding body image emerges as a significant mediator of these relationships. These results suggest that in young normal weight women, body dissatisfaction and social comparison based on physical appearance are linked to eating patterns characterized by inflexible eating rules, through the inability of openly and willingly accept perceptions, sensations, emotions and thoughts associated with body image, even when they are unwanted. That is, the

interpretation of these results suggests that body image-related negative internal experiences do not necessarily lead to the adoption of eating patterns marked by rigid rules, and that it is the inflexibility concerning those experiences that holds a significant impact on this association.

However, this study comprises some limitations. The first focuses on the cross-sectional nature of the study, not allowing the establishment of causal relationships between variables. In this sense, we suggest the development of longitudinal research in order to determine the predictability of the study variables. Furthermore, the fact that the sample does not include individuals from a clinical population, being composed only by college students, may explain some of the weak correlations found between the variables. Thus, it is suggested that future studies should be based on samples concerning different populations, including clinical populations, to enable comparisons between different groups.

Although this study comprises some limitation, it seems to be a significant contribute both for research as for clinical work in the body image and eating difficulties field. In fact, the present study highlights the universality of body-related negative self-evaluations by demonstrating their high prevalence even among women with normal weight, and their association with the endorsement of eating patterns marked by rigid rules. This study also points out the importance of developing an accepting attitude towards thoughts, emotions, and perception concerning physical appearance, even if these experiences are evaluated as negative by the individual. This ability emerges as particularly relevant as it is not possible to prevent experiences of negative social comparison or body image dissatisfaction. Therefore, clinical work should focus on the replacement of control strategies to deal with unwanted body-

related internal experiences, such as inflexible eating rules, by the development of more adaptive ones (e.g., acceptance, defusion and mindfulness).

## **6. Conclusion**

This study reinforces the results obtained in previous investigations showing that psychological inflexibility in relation to body image acts as a significant mediator in the adoption of disturbed eating behaviors (e.g., restrictive dieting). In addition, it pioneers the use of a measure of inflexibility regarding eating patterns. Finally, it reveals the need to develop interventions that promote greater psychological flexibility (through the acceptance of internal experiences and the intentional abandonment of experiential avoidances) in the general youth population, in order to prevent the development of eating disorders.

## References

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182. doi: 10.1037/0022-3514.51.6.1173
- Buote, V. M., Wilson, A. E., Strahan, E. J., Gazzola, S. B., & Papps, F. (2011). Setting the bar: Divergent sociocultural norms for women's and men's ideal appearance in real-world contexts. *Body image*, 8, 322-334.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.
- Engeln-Maddox, R. (2005). Cognitive responses to idealized media images of women: The relationship of social comparison and critical processing to body image disturbance in college women. *Journal of Social and Clinical Psychology*, 24, 1036–1060. doi:10.1521/jscp.2005.24.8.1114.
- Ferreira, C. (2003). *Anorexia Nervosa: A expressão visível do invisível. Contributos para a avaliação de atitudes e comportamentos em relação ao peso e à imagem corporal [Anorexia Nervosa: The visible expression of the invisible. Contributions for the assessment of attitudes and behaviors in relation to weight and body image]*. (Unpublished master's thesis). Universidade de Coimbra, Coimbra.
- Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2011). The Validation of the Body Image Acceptance and Action Questionnaire: Exploring the moderator effect of Acceptance on Disordered Eating. *International Journal of Psychology and Psychological Therapy*, 11 (3), 327-345.

- Ferreira, C. (2012). O peso da magreza: O corpo como um instrumento de ranking social [The weight of thinness: The body as a social rank instrument]. Unpublished doctoral dissertation, University of Coimbra, Coimbra, Portugal.
- Ferreira, C., Pinto-Gouveia, J., & Duarte, C. (2013). Physical appearance as a measure of social ranking: The role of a new scale to understand the relationship between weight and dieting. *Clinical Psychology & Psychotherapy*, 20, 55–66. doi:10.1002/cpp.769
- Ferreira, C., Trindade, I.A., & Duarte, C. (2014). *Normative Body Dissatisfaction and Eating Psychopathology in Teenage Girls: The Impact of Inflexible Eating Rule*. Manuscript submitted for publication
- Ferreira, C., Pinto-Gouveia, J., Duarte, C. & Martinho, A. (2014) *A New Measure of Inflexible Eating: Scale Construction and Validation*. Manuscript in preparation.
- Field, A. E., Austin, S. B., Taylor, C. B., Malspeis, S., Rosner, B., Rockett, H. R.,... & Colditz, G. A. (2003). Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*, 112, 900–906.
- Field, A. (2004). *Discovering statistics using SPSS* (3th ed.). London: Sage Publications.
- French, S. A., Jeffery, R. W., Forster, J. L., McGovern, P. G., Kelder, S. H., & Baxter, J. E. (1994). Predictors of weight change over two years among a population of working adults: The Healthy Worker Project. *International Journal of Obesity*, 18, 145-154.
- Garner, D. M., Garfinkel, P. E., Schwartz, D., & Thompson, M. (1980). Cultural expectations of thinness in woman. *Psychological Reports*, 47(2), 483–491. doi:10.2466/pr0.1980.47.2.483

- Gilbert, P., Price, J., & Allan, S. (1995). Social comparison, social attractiveness and evolution: How might they be related?. *New Ideas in Psychology, 13*, 149–165. doi:10.1016/0732-118X(95)00002-X
- Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta of experimental and correlational studies. *Psychological Bulletin, 134*(3), 460–476. doi:10.1037/0033-2909.134.3.460
- Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and Commitment Therapy: An experimental approach to behavior change*. New York: Guilford
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change (2nd ed.)*. New York, NY US: Guilford Press.
- Heinberg, L. H., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social and Clinical Psychology, 14*, 325–338. doi:10.1521/jscp.1995.14.4.325
- Herman, C. P., & Mack, D. (1975). Restrained and unrestrained eating. *Journal of Personality, 43*, 647–660.
- Higgins, T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319–340.
- Irving, L. (1990). Mirror images: effects of the standard of beauty on the self-and body-esteem of women exhibiting varying levels of bulimic symptoms. *Journal of Social and Clinical Psychology, 9*, 230–242.
- Jarry, J. L., Polivy, J., Herman, C. P., Arrowood, A. J., & Pliner, P. (in press). Restrained and unrestrained eaters' attributions of success and failure to body weight: Limitations of the false consensus effect. *Journal of Social and Clinical Psychology*.

- Jones, D. C. (2001). Social comparison and body image: Attractiveness comparisons to models and peers among adolescents girls and boys. *Sex Roles*, 45(9/10), 645–664. doi: 10.1023/A:1014815725852
- Kashdan, T. b., & Rottenberg, J. (2010). Psychological Flexibility as a Fundamental aspect of Health. *Clinical Psychology Review*, 30, 865-878.
- Killen, J. D., Taylor, C. B., Hayward, C., Wilson, D., Haydel, K., Hammer,... & Kraemer, H. (1994). Pursuit of thinness and onset of eating disorder symptoms in a community sample of adolescent girls: A three-year prospective analysis. *International Journal of Eating Disorders*, 16, 227–238.
- Killen, J. D., Taylor, C. B., Hayward, C., Haydel, K. F., Wilson, D. M., Hammer,... & Strachowski, D. (1996). Weight concerns influence the development of eating disorders: A 4-year prospective study. *Journal of Consulting and Clinical Psychology*, 64, 936–940.
- Klesges, R. C., Isbell, T. R., & Klesges, L. M. (1992). Relationship between dietary restraint, energy intake, physical activity, and body weight: A prospective analysis. *Journal of Abnormal Psychology*, 101, 668–674.
- Kline, R. (1998). *Principles and Practice of Structural Equation Modelling*. New York: The Guilford Press.
- Kruglanski, A. W., & Mayseless, O. (1990). Classic and current social comparison research: Expanding the perspective. *Psychological Bulletin*, 108(2), 195-208. doi:10.1037/0033-2909.108.2.195
- Masuda, A., Price, M., & Latzman, R. D. (2012). Mindfulness moderates the relationship between disordered eating cognitions and disordered eating

- behaviors in a nonclinical college sample. *Journal of Psychopathology and Behavioral Assessment*, 34(1), 107-115. doi: 10.1007/s10862-011-9252-7
- Merwin, R. M., Timko, C. A., Moskovich, A., Konrad, K. Bulik, C. M. & Zucker, N. (2011). Psychological Inflexibility and Symptom Expression in Anorexia Nervosa. *Eating Disorders*, 19, 62-82.
- Mond, J., Mitchison, D., Latner, J., Hay, P., Owen, C., & Rodgers, B. (2013). Quality of life impairment associated with body dissatisfaction in a general population sample of women. *BMC Public Health*, 3(13). doi: 10.1186/1471-2458-13-920
- O'Brien, K., Caputi, P., Minto, R., Peoples, G., Hooper, C., Kell, S., & Sawley, E. (2009). Upward and downward physical appearance comparisons. Development of scales and examination of predictive qualities. *Body Image*, 6 (3), 201–206. doi:10.1016/j.bodyim.2009.03.003.
- Polivy, J., & Herman, C. P. (1987). Diagnosis and treatment of normal eating. *Journal of Consulting and Clinical Psychology*, 59, 635-644.
- Rawal, A., Park, R. J., & Williams, J. M. G. (2010). Rumination, experiential avoidance, and dysfunctional thinking in eating disorders. *Behaviour Research and Therapy*, 48(9), 851–859. doi: 10.1016/j.brat.2010.05.009
- Robin, J., Silberstein, L. R., & Streigel-Moore, R. H. (1985). Women and weight: a normative discontent. In T.B. Sondregger (ED), *Psychology and gender: Nebraska symposium on motivation, 1984* (pp. 267-307). Lincoln: University of Nebraska Press.
- Sandoz, E. K., Wilson, K. G., & DuFrene, T. (2010). *Acceptance and commitment therapy for eating disorders: A process focused guide to treating anorexia and bulimia*. Oakland, CA: New Harbinger Publications.



- Sandoz, E. K., Wilson, K. H., Merwin, R. M. & Kellum, K. K. (2013). Assessment of body image flexibility: The Body Image – Acceptance and Action Questionnaire. *Journal of Contextual Behavioral Science*, 2, 39-48. doi:10.1016/j.jcbs.2013.03.002
- Spettigue, W., & Henderson, K. A. (2004). Eating Disorders and the Role of the Media. *The Canadian Child and Adolescent Psychiatry Review*, 13 (1), 16-19.
- Stice, E., Cameron, R. P., Killen, J. D., Hayward, C., & Taylor, C. B. (1999). Naturalistic weight-reduction efforts prospectively predict growth in relative weight and onset of obesity among female adolescents. *Journal of Consulting and Clinical Psychology*, 67, 967–974.
- Stice, E. (2001). A prospective test of the dual pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*, 110, 124–135.
- Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, 53, 985-993
- Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset: A prospective investigation. *Health Psychology*, 21, 131–138.
- Stice, E., Presnell, K., Shaw, H., & Rohde, P. (2005). Psychological and behavioral risk factors for obesity onset in adolescent girls: A prospective study. *Journal of Consulting and Clinical Psychology*, 73, 195–202.
- Strahan, E. J., Wilson, A. E., Cressman, K. E., & Buote, V. M. (2006). Comparing to perfection: How cultural norms for appearance affect social comparisons and self image. *Body Image*, 3, 211–227. doi:10.1016/j.bodyim.2006.07.004

- Thompson, J. K., & Altabe, M. N. (1991). Psychometric qualities of the figure rating scale. *International Journal of Eating Disorders*, 10, 615–619.
- Troop, N. A., Allan, S., Treasure, J. L., & Katzman, M. (2003). Social comparison and submissive behavior in eating disorders. *Psychology and Psychotherapy: Theory, Research and Practice*, 76, 237-249. doi:10.1348/147608303322362479
- Wendell, J. W., Masuda, A., & Le, J. K. (2012). The role of body image flexibility in the relationship between disordered eating cognitions and disordered eating symptoms among non-clinical college students. *Eating Behaviors*, 13, 240-245.
- Who. The World Health Report 2000. Obesity – Preventing and Managing the Global Epidemic. Geneva, 2000.